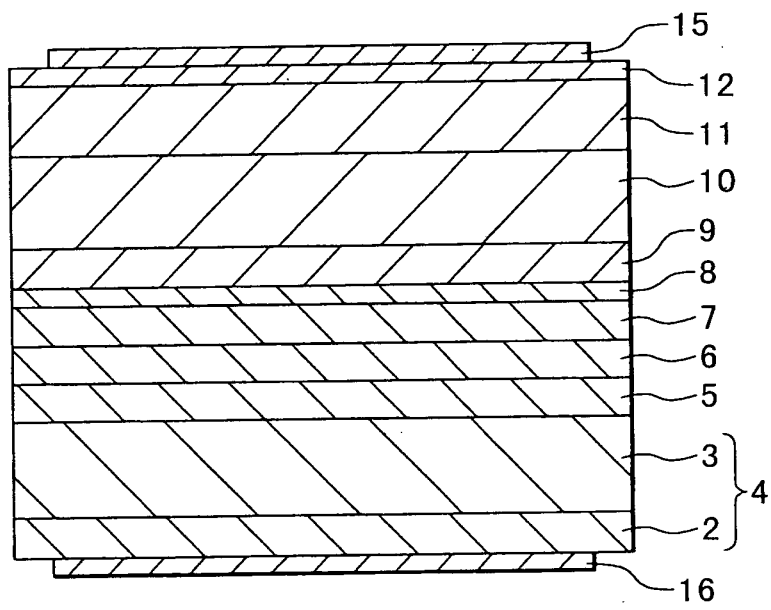
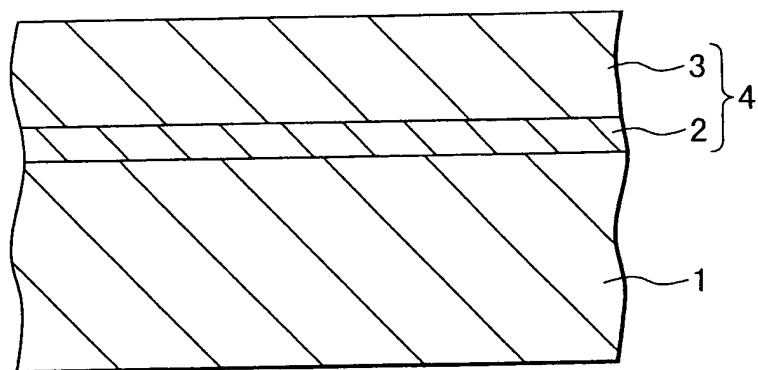


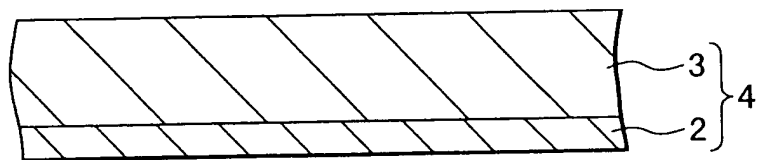
**FIG. 1**



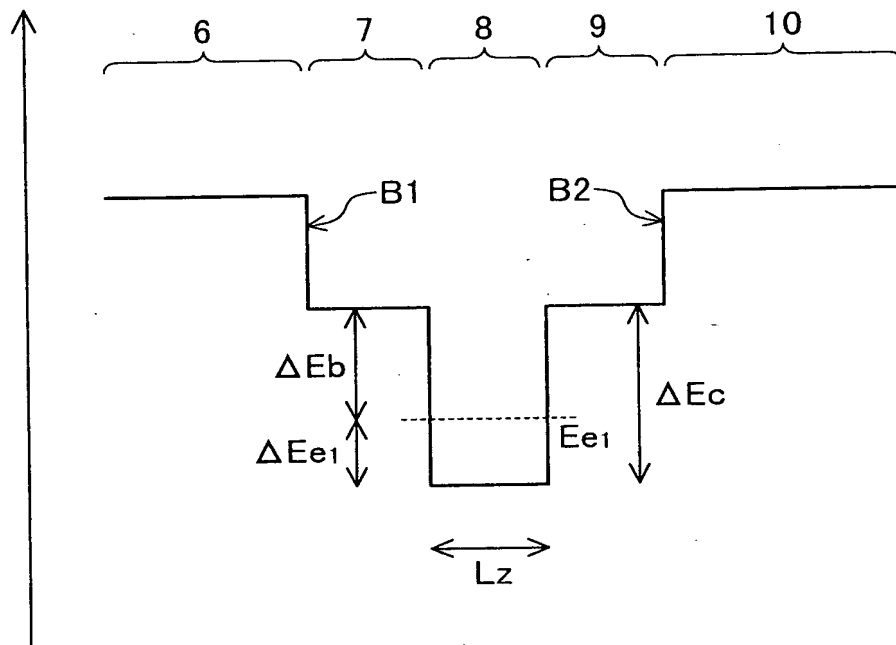
**FIG.2A**



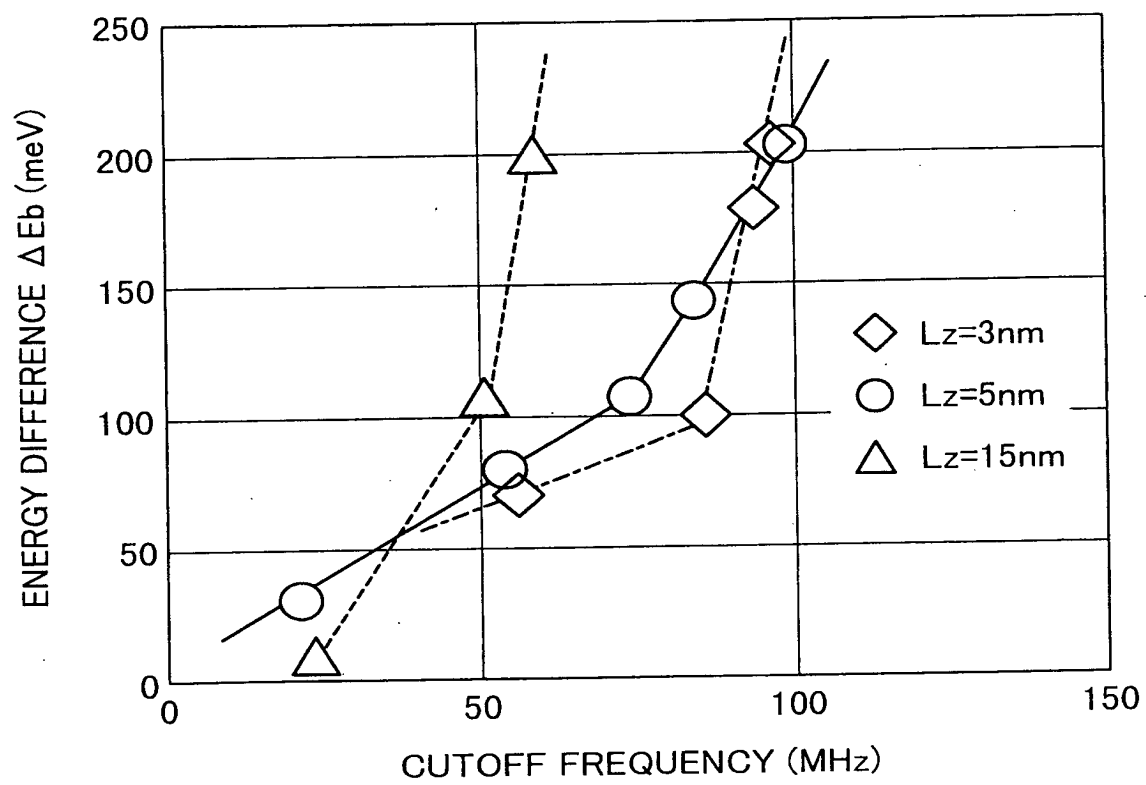
**FIG.2B**



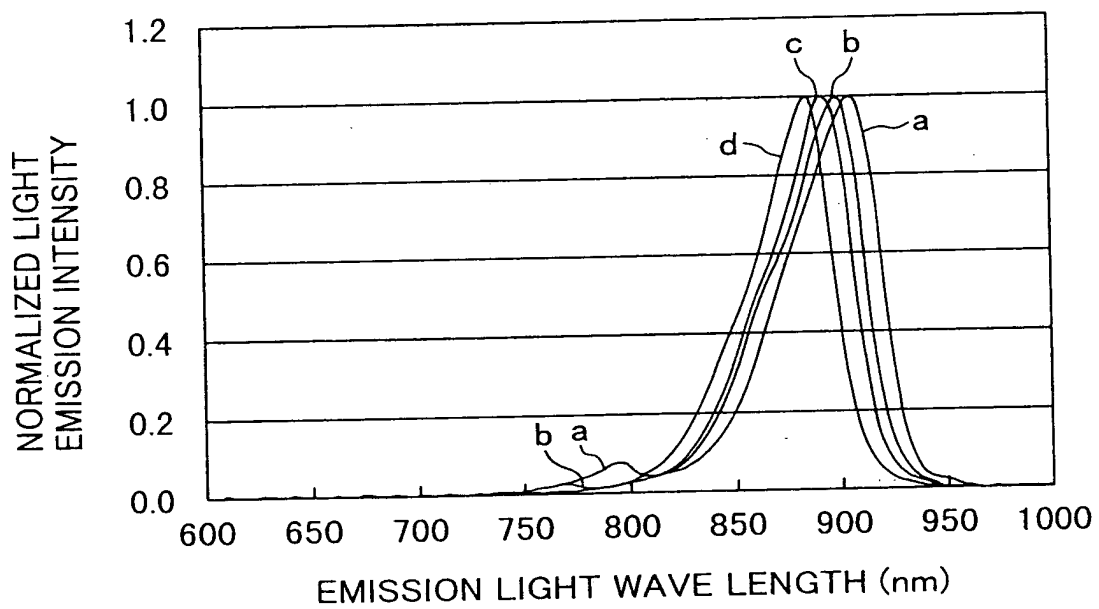
**FIG.3**



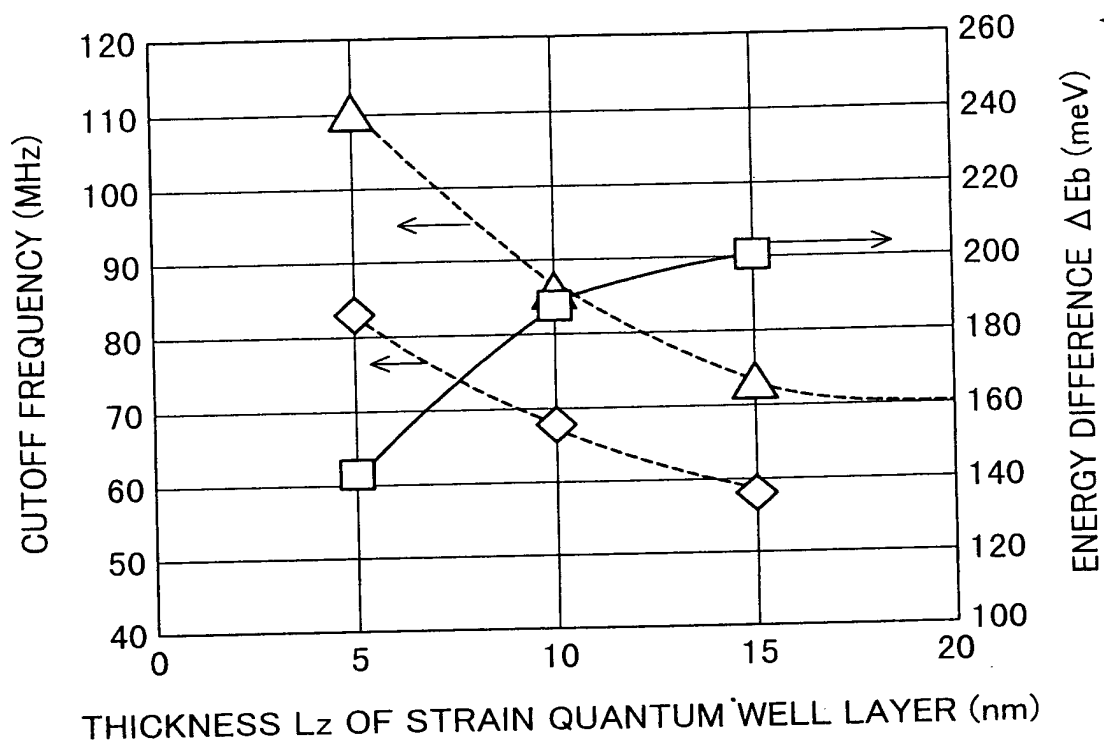
**FIG.4**



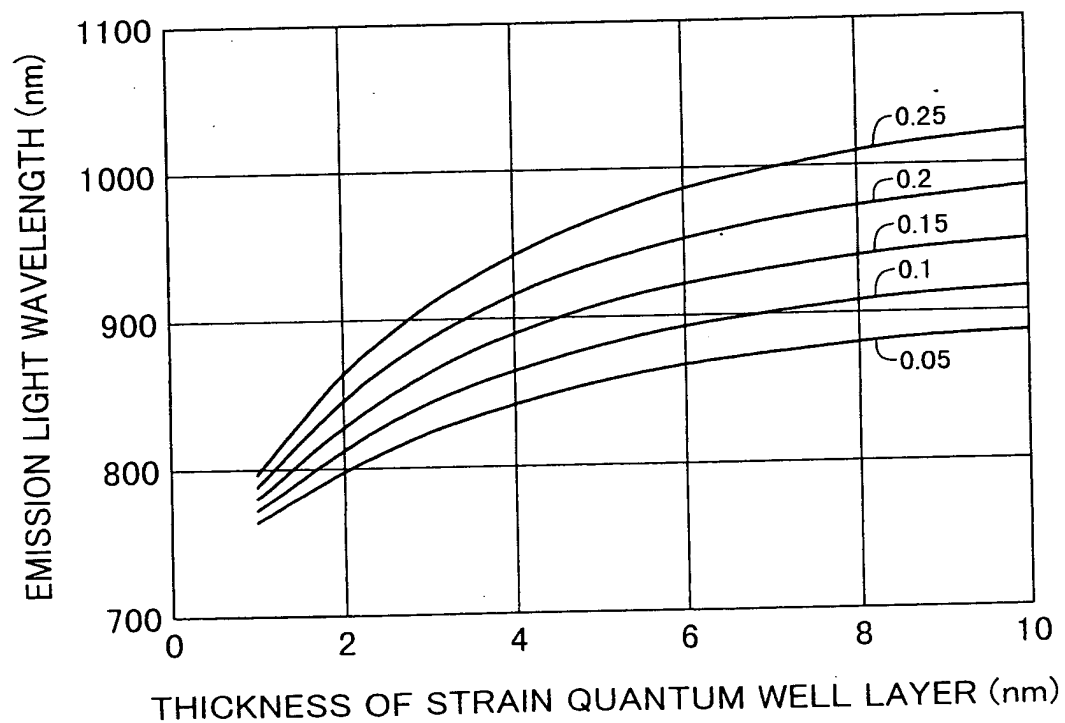
**FIG.5**



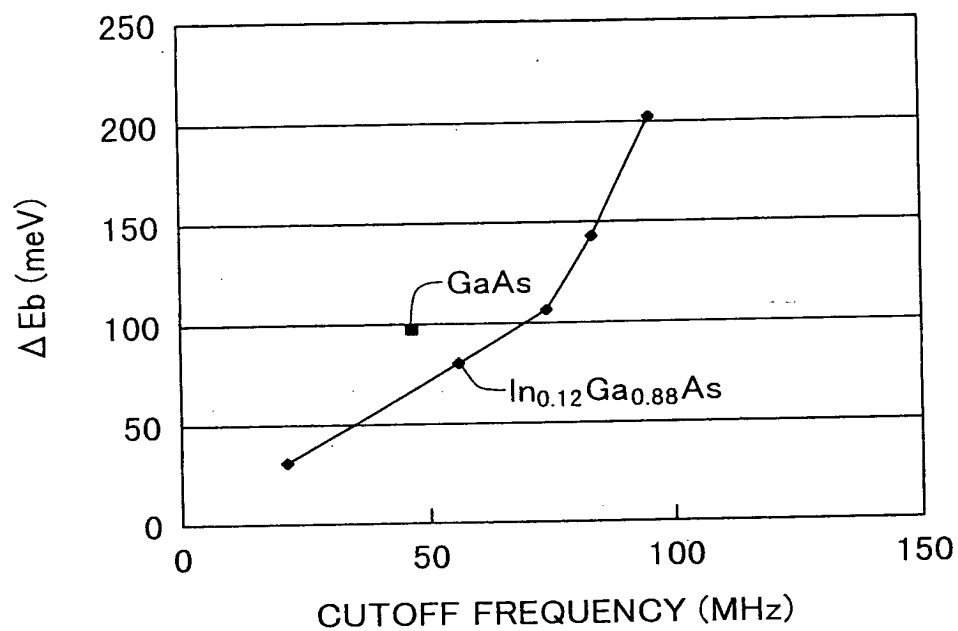
**FIG.6**



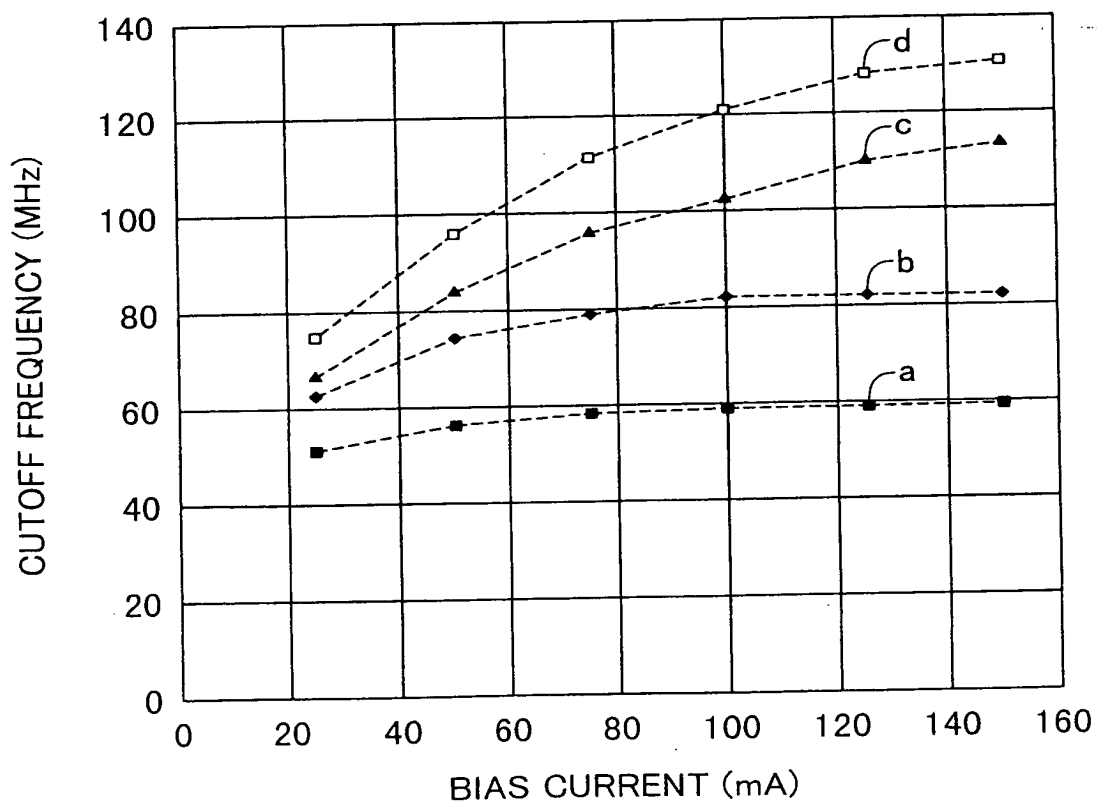
**FIG.7**



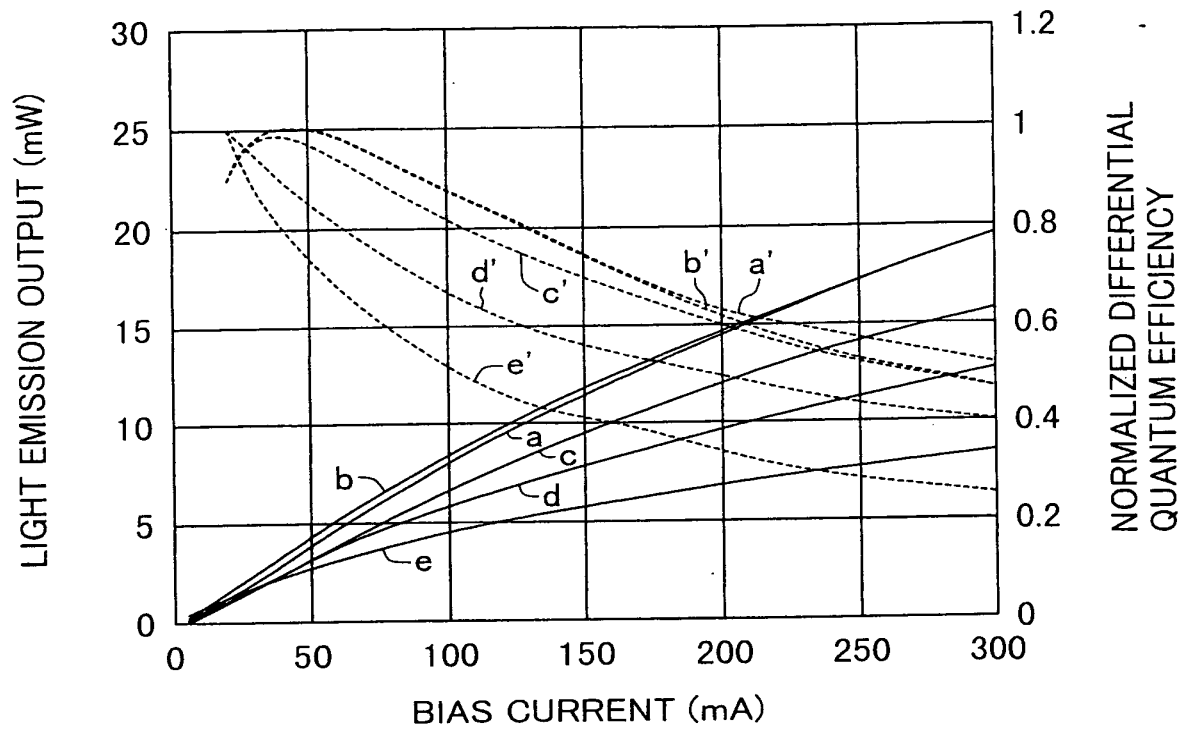
**FIG.8**



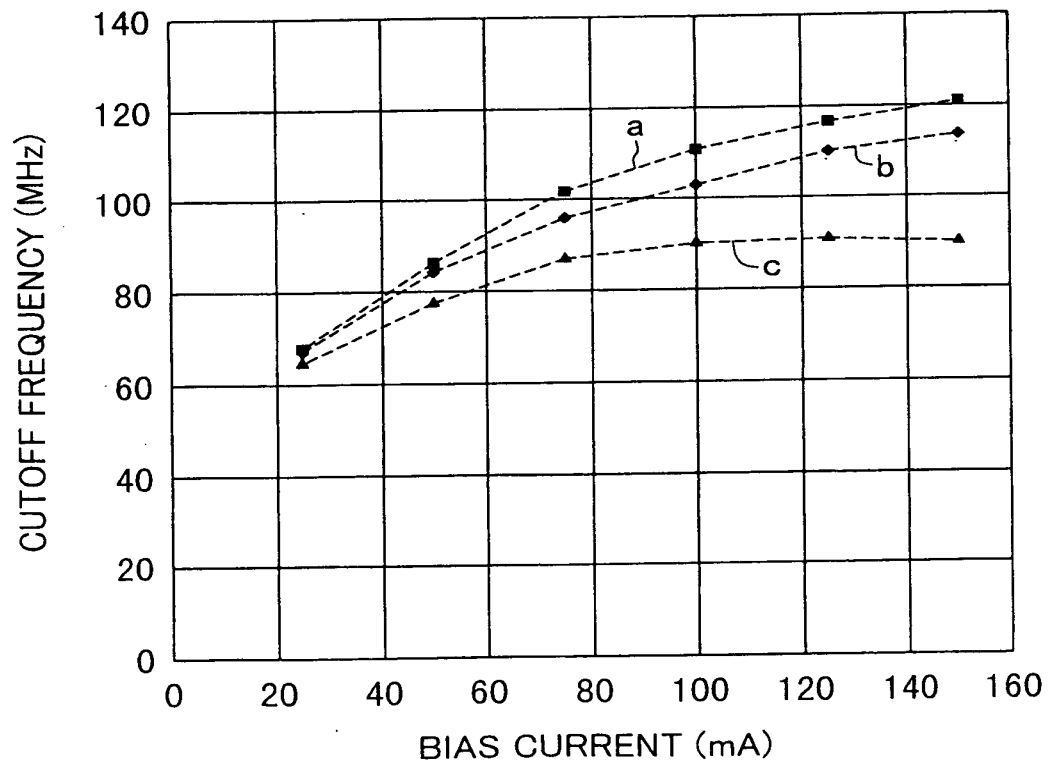
**FIG.9**



**FIG. 10**

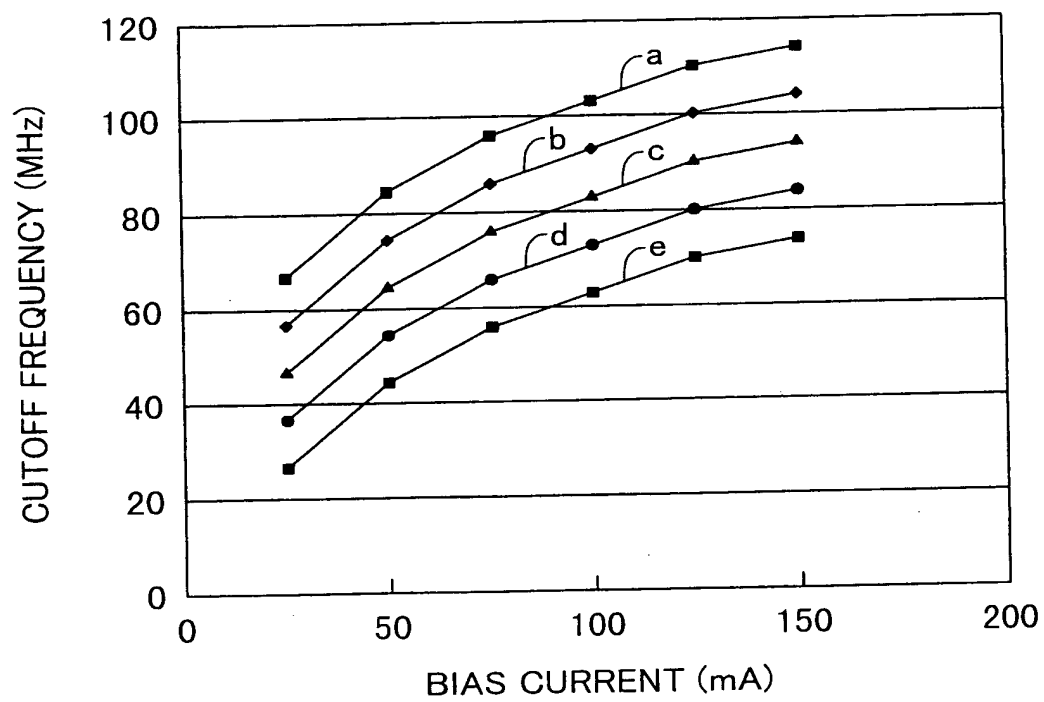


**FIG. 11**

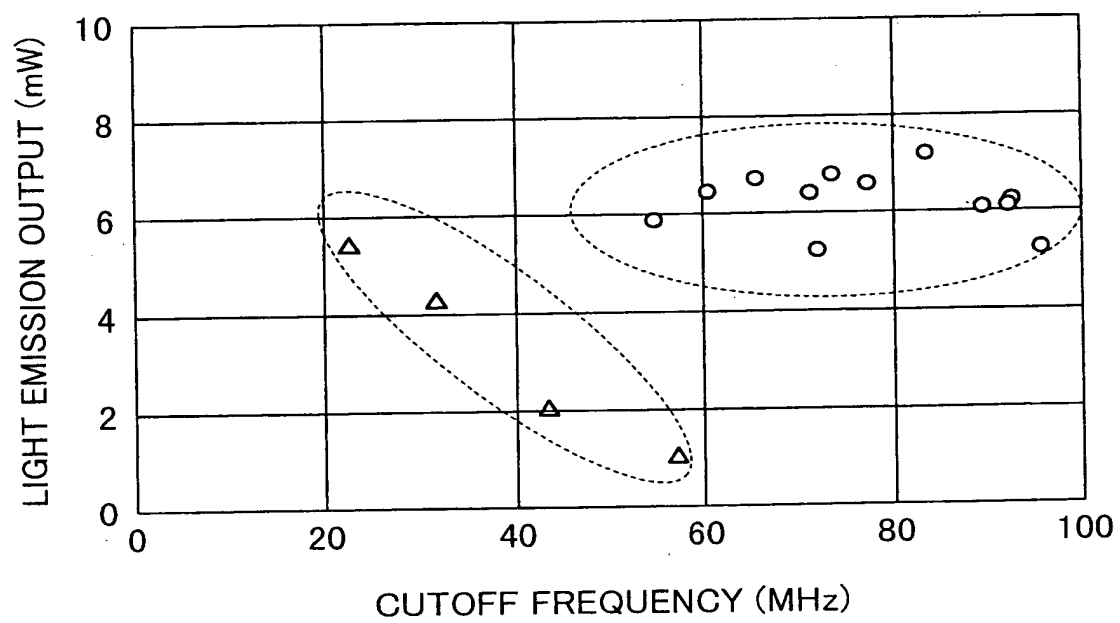




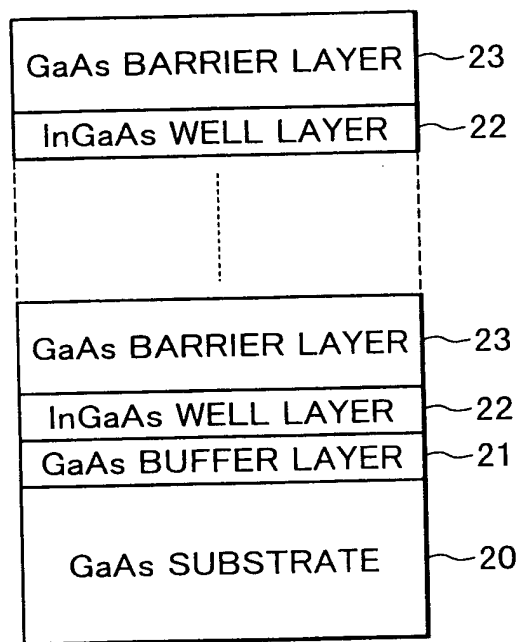
**FIG.12**



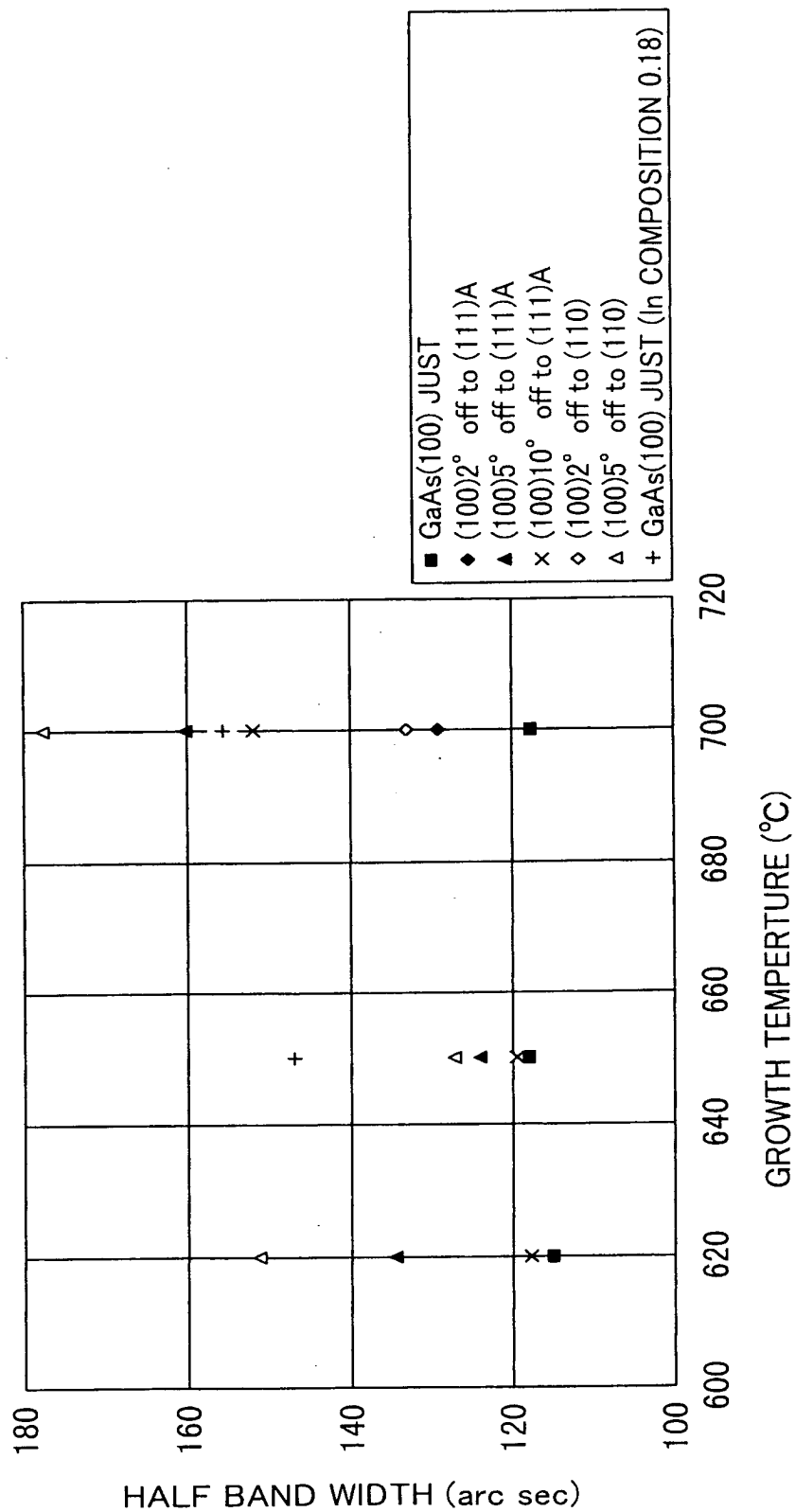
**FIG.13**



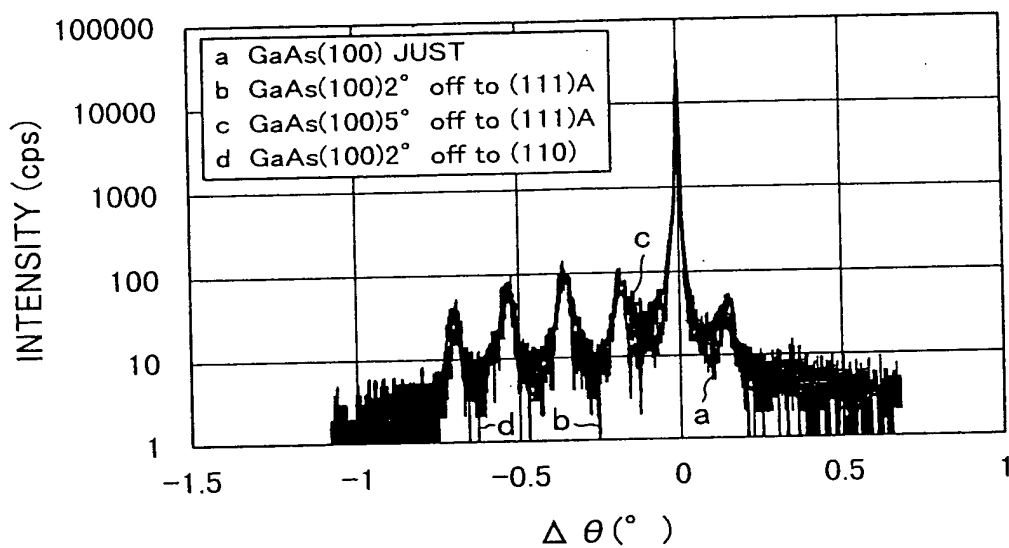
**FIG. 14**



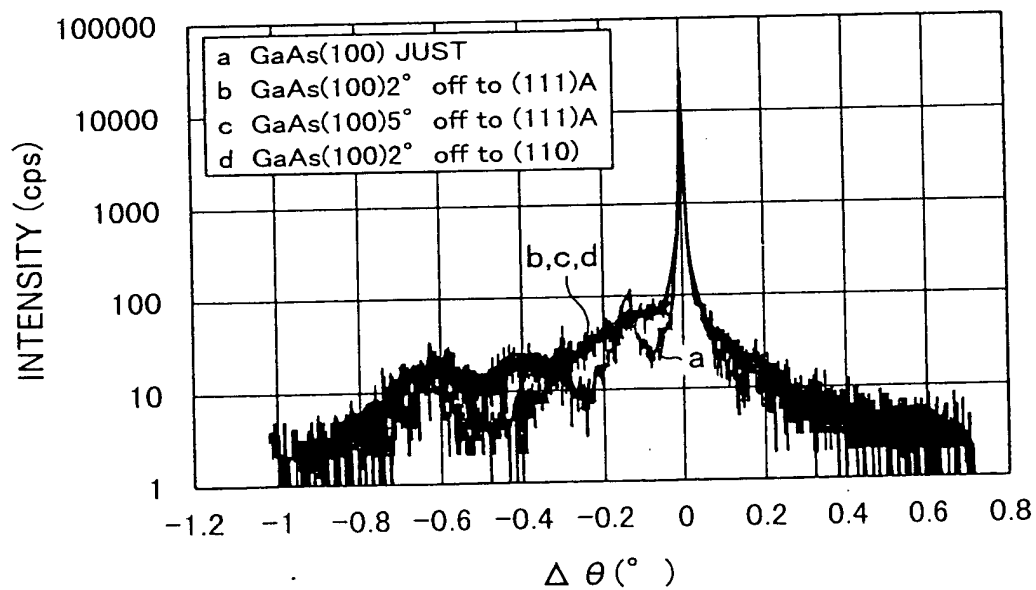
**FIG.15**



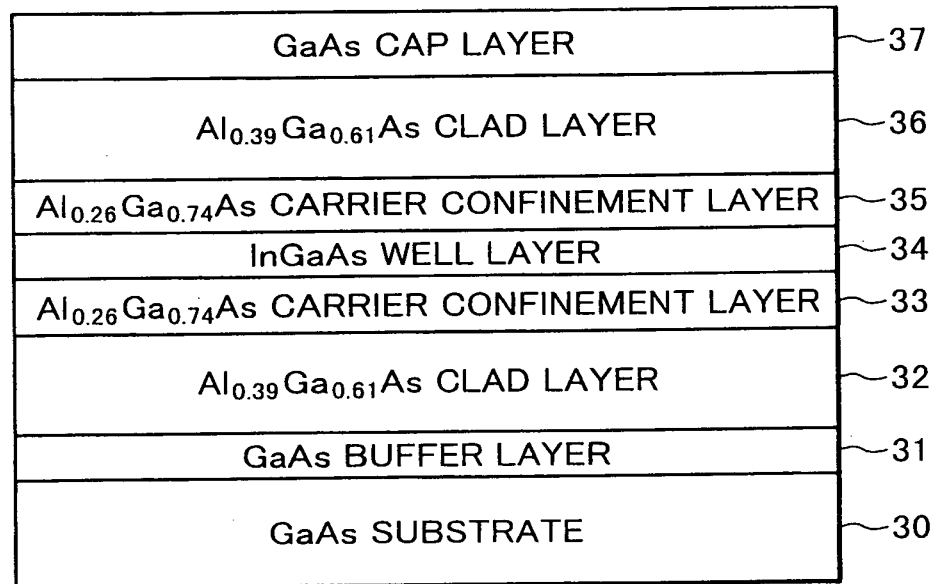
**FIG.16A**



**FIG.16B**



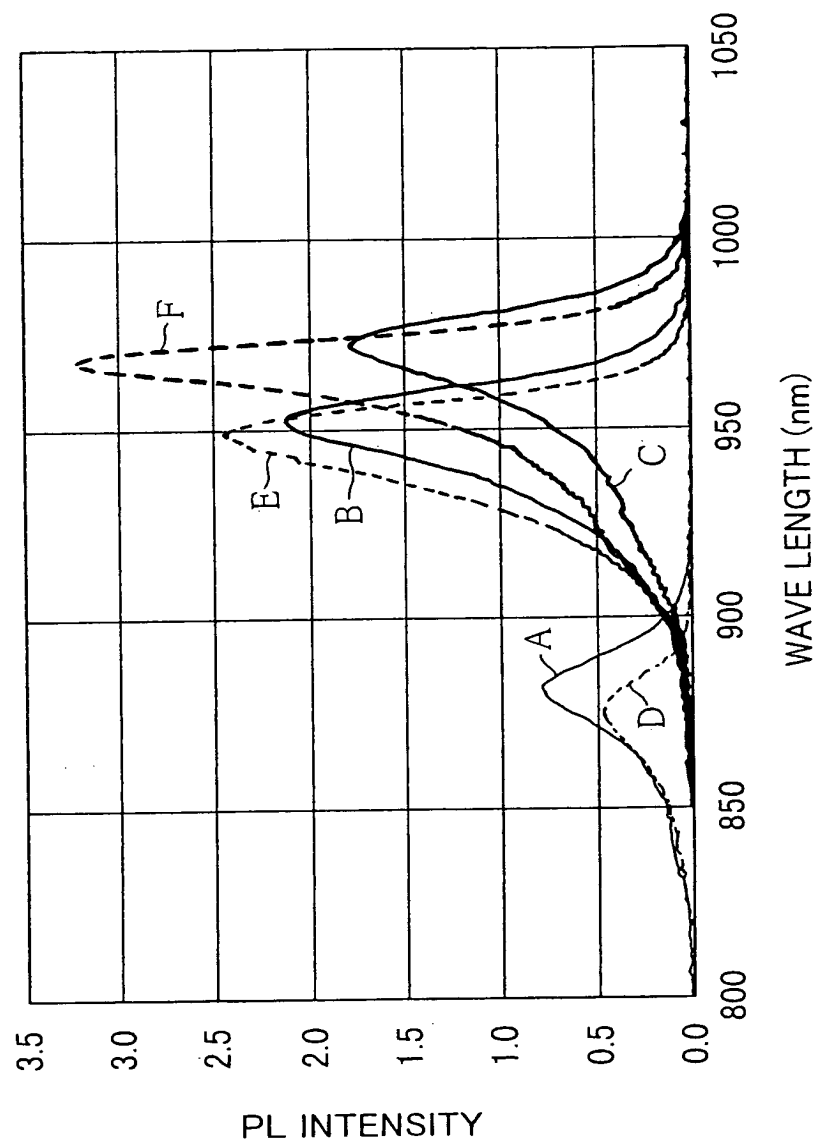
**FIG.17**



**FIG.18**

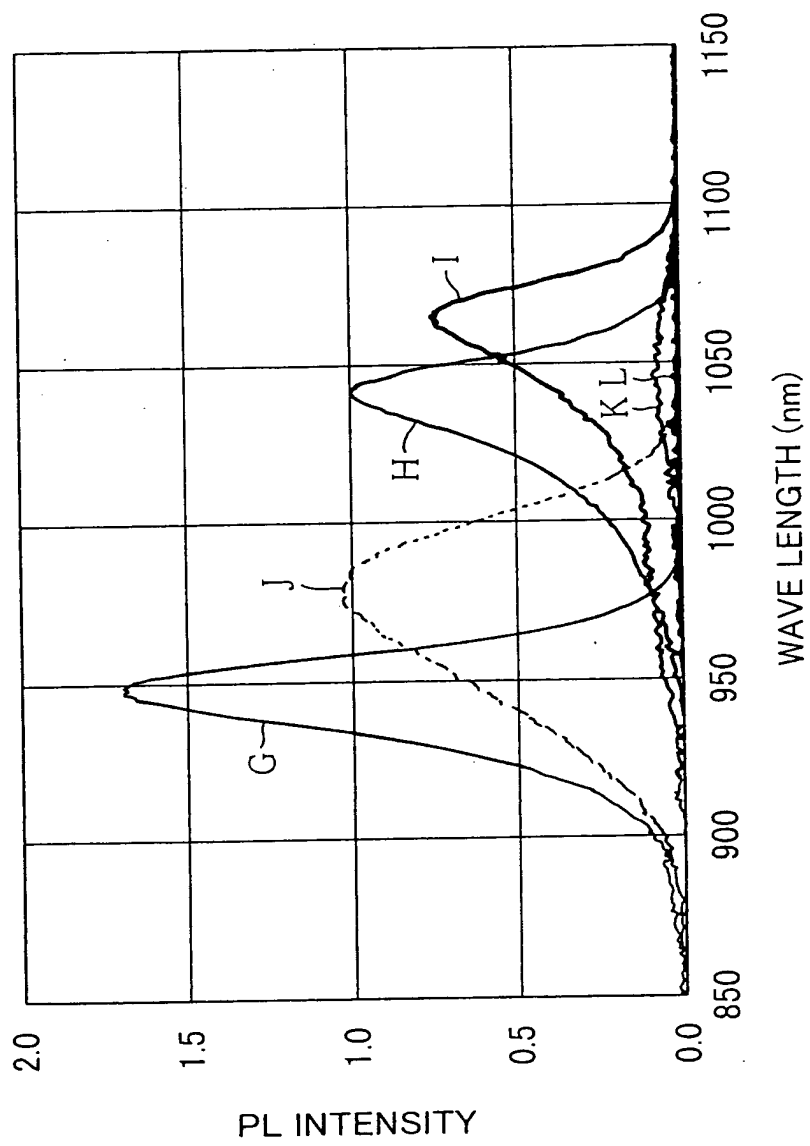
| SAMPLE | InGaAs QUANTUM WELL LAYER |                | SUBSTRATE                 |
|--------|---------------------------|----------------|---------------------------|
|        | In COMPOSITION RATIO      | THICKNESS (nm) |                           |
| A      | 0.12                      | 5              | GaAs(100) JUST            |
| B      | 0.12                      | 10             | GaAs(100) JUST            |
| C      | 0.12                      | 15             | GaAs(100) JUST            |
| D      | 0.12                      | 5              | GaAs(100)5° off to (111)A |
| E      | 0.12                      | 10             | GaAs(100)5° off to (111)A |
| F      | 0.12                      | 15             | GaAs(100)5° off to (111)A |
| G      | 0.18                      | 5              | GaAs(100) JUST            |
| H      | 0.18                      | 10             | GaAs(100) JUST            |
| I      | 0.18                      | 15             | GaAs(100) JUST            |
| J      | 0.18                      | 5              | GaAs(100)5° off to (111)A |
| K      | 0.18                      | 10             | GaAs(100)5° off to (111)A |
| L      | 0.18                      | 15             | GaAs(100)5° off to (111)A |

**FIG.19**

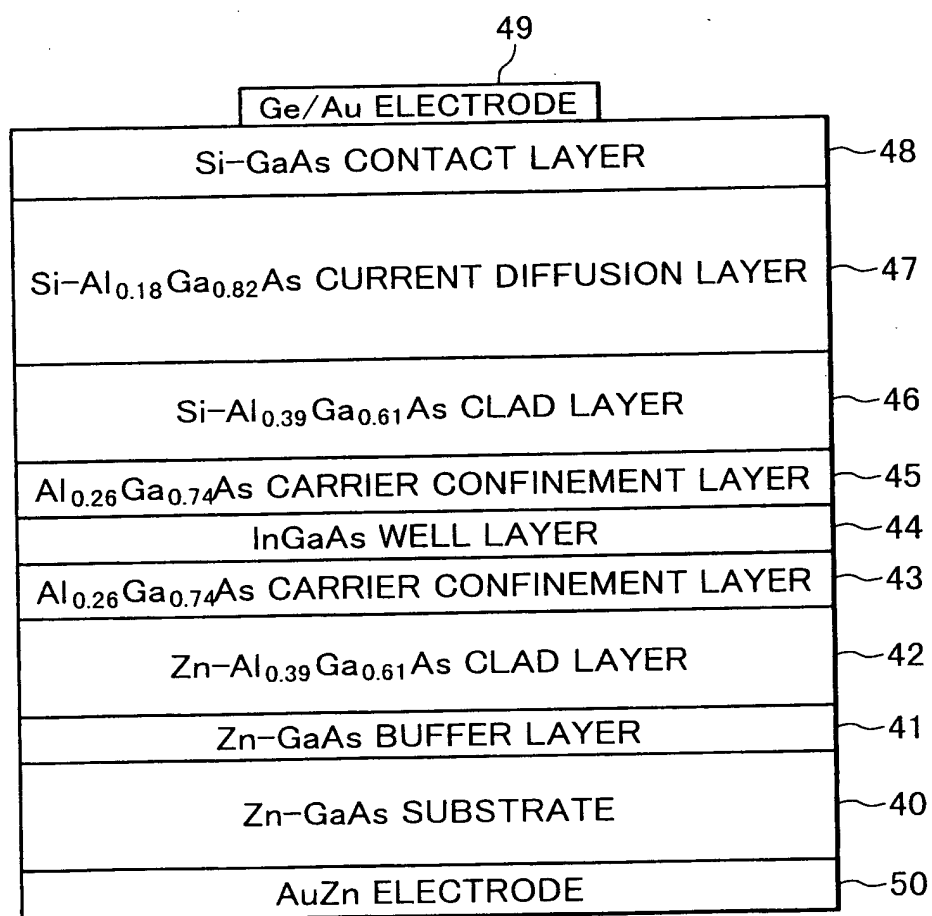




**FIG.20**



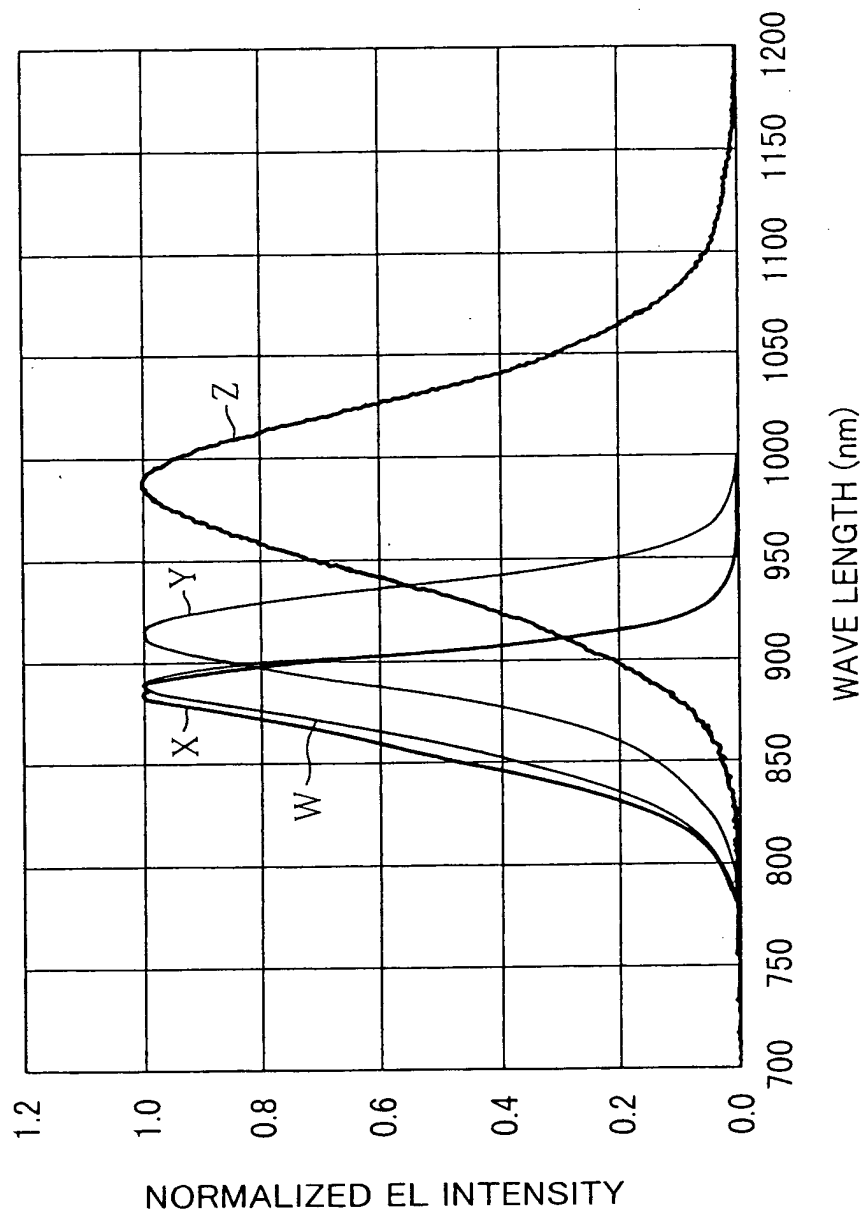
**FIG.21**



**FIG.22**

| SAMPLE | SUBSTRATE                 | InGaAs QUANTUM WELL LAYER |                | EL INTENSITY<br>(mW) | HALF BAND<br>WIDTH (nm) OF<br>EL SPECTRUM | CUTOFF<br>FREQUENCY<br>(MHz) |
|--------|---------------------------|---------------------------|----------------|----------------------|---|------------------------------|
|        |                           | In COMPOSITION<br>RATIO   | THICKNESS (nm) |                      |   |                              |
| W      | GaAs(100) JUST            | 0.12                      | 5              | 2.2                  | 46.3                                      | 81.9                         |
| X      | GaAs(100)5° off to (111)A | 0.12                      | 5              | 2.1                  | 57.6                                      | 79.0                         |
| Y      | GaAs(100) JUST            | 0.25                      | 3              | 2.0                  | 56.8                                      | 105.1                        |
| Z      | GaAs(100)5° off to (111)A | 0.25                      | 3              | 1.3                  | 99.9                                      | 112.9                        |

**FIG.23**



**FIG.24**

